

ABSTRACT

A magnetic rotational position sensor comprises a loop pole piece, one or more magnets, and one or more magnetic flux sensitive transducers, and may further include an auxiliary pole piece. The magnet(s) are disposed within an air gap area of the loop pole piece to enclose magnetic flux within the loop pole piece. A magnetic field ~~are~~ is thereby established throughout the air gap area. A control shaft is rotatable about a first rotational axis over a definable range of rotation, and the loop pole piece and the magnet(s) are adjoined to the control shaft to synchronously rotate the established magnetic field about a second rotational axis. A working air gap area is defined within the air gap area of the loop pole piece between a pole surface of a magnet and an inner diameter surface of the loop pole piece, between opposing pole surfaces of a pair of magnets, or between a pole surface of a magnet and a surface of an auxiliary pole piece. Each working air gap area is arcuately configured. A magnetic flux sensitive transducer disposed within that working air gap area is therefore operable to sense a different magnitude of magnetic flux density passing through the magnetic flux sensitive transducer as the control shaft and the magnetic field are synchronously rotated over the definable range of rotation.